The Madras Agricultural Journal

Vol. XXXVI SEPTEMBER 1949 No. 9

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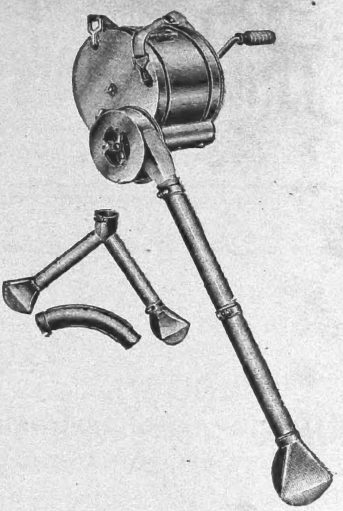

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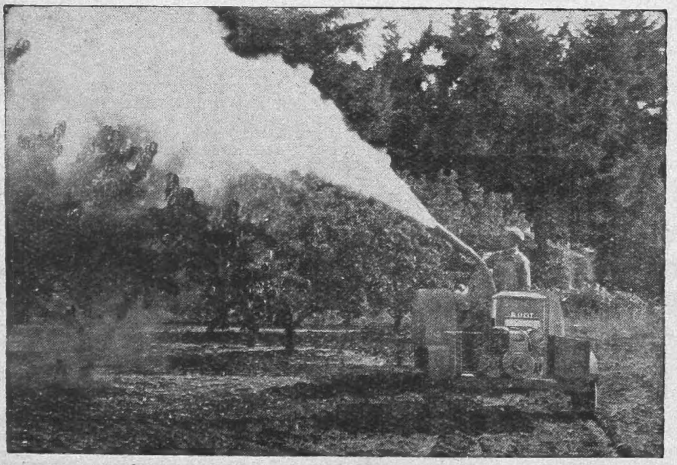

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The Madras Agricultural Journal

(ORGAN OF THE M. A. S. UNION)

Vol. XXXVI September 1949 No. 9

Editorial

Plantation crops : At their 52nd annual gathering the U.P.A.S.I. have pleaded for an all-round relief. The small cultivator has perhaps for the first time in his life, been able to make a clear profit. With this he has to now clear himself of long accumulated debt and rebuild his depleted stock of implements and cattle, rebuild his home and also the fertility of his soil. Certainly he has a cause to grumble, since his profits are only short lived unlike those of the other industries. He is the back bone of the country and on his welfare and prosperity lies the prosperity of the country. With the plantation crops the case is not entirely so. The industry from the beginning was built up in a manner that it depended on foreign countries for its prosperity. So long the British Empire dominated the world and empire preference and vested interests lay with India a monopoly was created. Now that Tropical Australia and South Africa have been rapidly developing these same plantation crops preference will slowly and surely veer to those countries, especially with regard to tea, jute and coffee. Though an internal market has been created in India for coffee and tea it is not large enough to consume the surplus, especially, in tea. The situation has to be therefore, reviewed whether preference should not be given to such plantation crops in which India is dependent on foreign countries, crops like rubber, cloves, jute and pepper to a certain extent. Climatic and soil conditions conducive to the growth of rubber and cloves are available in South India from Travancore to Northernmost coffee belt in Mysore. Rubber has been tried and grown in these areas. It is gratifying to note that the Central Government have taken steps to develop and protect this important civil and wartime material. The planter deserves relief and encouragement in effecting its expansion, since he deals with a long-term crop and his capital gets locked up. Research work has to be encouraged in all the plantation crops and if India has to maintain her present place in the open market tomorrow, her produce will have

to be cheap and of the best quality. We earnestly hope that with concentration on quality production through research and the co-operation of labour the object will be achieved.

Sugar Price control: It is a timely and quick action that was taken and the Government of India should be congratulated, in that it did not inspite of all criticisms and excuses lose sight of the interest of the cultivator and consumers. Sugar prices even during thick of war was far lower than the normal price now. A firm action has to be taken to remedy an evil disease.

Expert Committee on Agricultural Research: On a recommendation of the Retrenchment and Reorganisation Committee, the Government of Madras have set a Committee of Experts to review the progress of research work done in the Provincial Agricultural Department during the five year period 1944—'48, in order to assess the value of the results achieved so far in terms of practical application to agriculture and to suggest further lines of work to be carried out in all branches of agricultural science. Dr. G. S Cheema, D. Sc., Retired Fruit Development Adviser to the Government of India is the Chairman of the Committee, and the other members are: Dr. T. S. Venkataraman, D. Sc. former Sugarcane Specialist to the Government of India; Dr. D. V. Bal, M. Sc. Ph. D., Director, Institute of Plant Industry, Indore and Dr. Jayachand Luthra, Principal, Agricultural College, Benares Hindu University. We understand that the Committee have started work this month, and it is expected that their reports will be ready before the end of November this year. The members of the Committee are all persons with great experience and achievement in research behind them and we have no doubt, that a critical review from them with constructive proposals for the further development of Agricultural Research in the Province, would be very helpful both to the Government and research workers also. We extend our hearty welcome to the members of the Committee and wish them success in their task.

How best to translate the results of Research for the benefit of the average farmer*

By

B. M. LAKSHMIPATHY, B. E., M. E., M. R. A. S. E.

(Joint Director of Agriculture, Madras)

In all countries in the world, both advanced and less advanced, the State Agricultural Institutions and Service Organisations are the most outstanding helpers for farmers. These research and development institutions do many things for the cultivator which he cannot do himself, and this is particularly applicable to agricultural research, which pays big dividends to the rural community as a whole. Agricultural research is not a job for the cultivator and it seldom attracts private enterprise, partly because of the cost and uncertainty involved and partly because no one can monopolise the benefits. Agricultural Research is principally a job for Government institutions, Agricultural Colleges and Experiment stations. If such research is not taken up by the State, this will not be done at all.

Such new facts as are found by these researches should be made known to the farming community and others. This part of the educational and developmental work is as important as the research itself and the spread of useful information of agricultural and related subjects should also be intensively pursued by the Government agencies. In addition to the spread of such scientific information, provision should also be made for providing the necessary services and supplies at the various points from soil care to marketing and agricultural financing. The same services should also help the farmer in the development of new and wider uses of agricultural products and by-products, study human and animal nutrition, provide various living requirements, make surveys of foreign agricultural conditions, assist agriculturists in co-operative crop adjustments and help in the regulation of produce-markets. Assisting agriculturists to grow better plants and breed better animals, though the basic item, must have a counterpart in marketing help. The Department and other State agencies in addition to keeping a watch on agricultural production at home and abroad should also give facts to help the farmer to decide what to grow. The "What" is as important as the "How".

In order that the results of Research may spread among the cultivators on a popular basis, they must be of intrinsic economic value. This result could normally be achieved in two ways, either by effecting a saving in the existing methods of cultivation and other processing expenses that an agriculturist has necessarily to incur in raising a crop or it may be a means by which more yields than what would normally be obtained could be realised, by adopting certain new things. So far researches carried out by the Department have been more of a uni-purpose

*Paper read at the 32nd College Day and Conference

type and there have been very little of multi-purpose researches. For researches to be of greater utility and afford increased benefit to the cultivator, more items of the multi-purpose pattern need to be undertaken. Experimental investigations which aim at solving a combination of problems are bound to contribute in a large measure for the improvement of agriculture as such than an investigation that is expected to lead to solve only one aspect of a problem.

For research results to be readily applied on a popular basis by the cultivators, the problems should have some special relation or reference to the particular regions or areas. In other words, it means that the problems of the several districts each of which may have a peculiar bearing of its own, should be grouped and planned on a larger scale than others that may have a greater academic value and add merely to the scientific achievements. The various research branches should have combined comprehensive problems of an interrelated nature, involving team work and co-operative spirit, and these should be studied from all aspects so that the cumulative attempts of the different sectional workers may, when added together lead to quicker solutions and all-round benefits. At the moment each research section draws up its own research programme and this has led to a tendency for isolation and separatism among research workers without creating a corporate atmosphere so necessary for the advancement of scientific agriculture.

Similarly a closer and more intimate association than at present, of the officers connected with district work and the Research workers, is necessary. Even at the stage of drawing up the proprammes for research, either on a three-year or on a five-year basis, the District Officers should be consulted to have the benefit of their local experience and knowledge, to have the basic outlines drawn on a comprehensive scale. Incidentally this will increase the scientific out-look of the District Officers, and enable them to have that sustained bent for developing their regions by the application of science to agriculture. In other words, it implies that there should be greater active contacts between the research workers and the development staff in the districts to create that foundation so very essential for the extension of scientific service among the rural population.

When drawing up a list of the items of research, the demands from certain ryots or even individual representative cultivators should be given first consideration, so that as soon as a solution is reached, there will be ready ground for their immediate application. In such cases, there will be no need to persuade cultivators to take up new things, as these are what they have been waiting for anxiously. The enthusiastic ryot is already existing, and the result or results could be readily demonstrated on his field. It will spread more quickly on a popular basis than other

items for which the initial call did not originate from the cultivator himself. By adopting this procedure, cultivators themselves are brought directly on to the research and development sides of agricultural science, even at the preliminary planning levels.

Just as the different sections on the research side formulate their plans of work in advance for a few years on either a short term or a long term basis, it is necessary that the propaganda and developmental work in the several districts should also be planned in advance. The recent war has brought home to all nations that a modern State can only develop if its activities are co-ordinated on a planned basis in a common direction. Planning of agricultural development on a scientific basis is an immense task which will occupy the best human activities for many years and it must be carried out on a thorough and organised scale. In such developmental planning there must be a long term policy and a short term plan.

In the broadest sense, education brings some kind of State help and service, and functions such as commodity grading and seed certification require an educational basis. In the United States of America, the State Department of Agriculture has a number of educational agencies such as the Public Relations Office, the Extension Service, the Rural Electrification Administration and other subjects. Among the facilities offered are publications, press and radio services, motion pictures and exhibits, farmers' discussion groups, lectures, and correspondence. For example, the same State Department of Agriculture issues yearly 25,000,000 copies of farmers' bulletins, circulars, periodicals, publication lists, and other literature.

Some years ago, even of a country like the United States, it used to be said that farm practice in that land was many decades behind farm science. To-day the gap is not so wide and American agriculture has attained a high degree of efficiency. In 1943, American farms were said to produce only 47 % more food than in 1918 after the first World War's peak food production. It is often mentioned that farmers in the advanced West are efficient because they strive to keep up with science and also because the Government and Departmental agencies carry agricultural science to them. Originally, the extension work in the western countries also dealt chiefly with only the agricultural prduction aspect. But now it has taken up every phase of agriculture and farm living. It is no longer confining its importance to mere production. They teach how to grow more per acre, how to get more meat and milk from their livestock for each pound of feed and also how to take care of their land. Nowadays extension work goes very much farther than furnishing mere information. It helps in arranging supplies of all kinds, in arranging for the storage of crops when the need arises, in drought relief measures, in rural relief and rehabilitation, and in numerous other ways. In many of these

activities educational and service help are rendered together on the principle that what the farmer understands will do more good to him than what he is not able to understand.

Another important extension work in the United States is the 4. H. Club These clubs — whose name stands for works with Health, Heart, Head and Hands — have members to complete certain farm and home activities under the supervision of the State agency. Their projects include all elements of farming and home making, and include community activities as well. These members have become pioneers in their communities for better farming and better living. They have helped to enlarge food and fibre production, to store and preserve food, to relieve labour shortages on farms, and assist the local committees in the various campaigns.

To-day all national Governments have accepted the responsibility for ensuring that adequate supplies of food necessary to health are available to all members of the public, at reasonable prices and it is in accordance with the recommendations of the United Nations Conference on Food and Agriculture, held at Hot-Springs in 1943 for raising the standard of nutrition of the people. Great Britain's new long term policy for agriculture echoes on the national level, that of the Food and Agriculture Organisation of the United Nations on the international level. It also aims at developing and organising food production to provide diets on a health standard for the people and at stabilising agricultural prices at levels fair to producers and consumers alike.

In England the Agricultural Research Council is the State Department responsible for the fundamental research. For the application of scientific investigations to farming practice the Agricultural Improvement Council was set up in June 1941. This same body was established on a permanent basis in July 1944. A National Agricultural Advisory Service was set up in October 1946 under the Agriculture (Miscellaneous Provisions) Act, July 1944. Advice on agricultural economics continues to be provided by staffs attached to the Universities and Colleges. The National Service includes all those concerned with advisory work to farmers at the Provincial and County centres. This arrangement is intended to facilitate general direction and guidance, securing of greater uniformity of work and co-ordination of specialist and general advisory activities. The programme of experimental work is drawn up under the guidance of the National Agricultural Improvement Council and steps are also taken to set up a series of experimental farms throughout the country.

After briefiy touching upon what is known to be done in two of the leading agriculturally advanced countries of the World, the direct question as to what extent and how such scientific associations could be linked up

with our own Provincial programme, may now be taken up. The national slogan, as in other parts of the world, has to be "Full efficient production at home for as long as we can possibly foresee". While providing for stability, there must be sufficient flexibility to enable adjustments to be made to meet changing needs. Reliance has to be placed on advice and price mechanism, to steer production in the direction desired by national policy, subject to one exception — national emergency. The Government's policy both to save foreign exchange and for good farming, should be to switch our production, as rapidly as the cereals position permits, from the production of crops for direct human consumption to the production of other commodities. Local agriculture should be made not only capable of producing the regional requirements but should in addition produce such part of the food supply as may be desired in the national interest.

The position in respect of our own Province may be finally summarised as follows. The 'Grow More Food' campaign was originally started in 1943. This was enlarged on a long-term basis and expanded in a comprehensive manner early in 1947 into the 'First Five Year' programme for stepping up food production in the Province to conform to the National schemes. Recently this has been further altered into a 'Two Year' plan aiming at still greater production. One factor that clearly emerges out of these several plans is that changes and alterations have been more prominent than continuance and stabilisation of current and running items. For any substantial and progressive achievement, steadiness and sustained effort are absolutely essential, and the finally forecast results cannot be achieved at too early a stage. These however may be taken as the first stages of concerted large-scale national efforts attempting to raise the the level of agricultural production in the country as a whole. In all these national plans, large-scale aplication ot science to agriculture formed the basis for food production increases.

Just over a decade back, the question of the condition of higher agricultural education was seriously considered. It was observed that teaching, separated from research as it then existed, was not giving of its best to the students, and an amalgamation of teaching and research was effected. By this combination the students were enabled to get the latest researches taught to them by the research workers. This combination resulted in a certain amount of betterment. The present day position of agricultural development and propaganda may be taken to occupy an analogous position with the research workers not having that close mutual touch that they should have. In the same way as students were not getting their best, the ryots may, in this position, not be getting the best from scientific agriculture. It is not enough if these two agencies alone are brought together. There is a third and more important active link that has to be made to participate in a connected manner in these development programmes, and that is the owner of the land or the actual tiller of the

soil. The cultivator's willing co-operation is the most essential thing for achieving practical results, and hence close and intimate contacts between the Departmental Officers and the cultivating public on a more intensive scale than at present are essential.

A practical way of attempting to realise this is to locate the research workers and the district workers at one and the same centre, so that they may have constant mutual contacts and discussions about their several problems. The research problems for these stations, as stated already, should be drawn up with particular reference to the requirements of the concerned regions and tracts so that the solutions may immediately be taken up by the cultivators for application to their lands. By centralising the location of the district and research workers, visiting ryots to such centres will also be given an opportunity to go round the experimental station and get into touch with the scientific atmosphere which could later be incorporated in their own lands. It will at the same time afford greater opportunities to the public, to meet both the research workers and the district officers frequently at a common meeting place. The research stations that are at present tackling only experimental problems should be made to serve a dual purpose. They should be converted into combined experimental and demonstration farms. Such a change will make the farms serve the ryots and science together on a popular basis, and will also increase their utility to the public who can see clearly and understand the scientific side and the advantages of scientific agriculture applied in bulk to the land. Such a modification in the existing district and research organisations is sure to contribute to the filling up of the existing gap between the research findings and developmental plans on the one hand, and between scientific agriculture and the cultivating public on the other. By thus bringing the regional public to associate actively with the work and workers of the Department at such centres, there will be increased interest evinced in the development of agricultural science as a whole and a fuller realisation of its advantages bp the cultivators.

I would therefore suggest that in each district the research workers and the developmental officers discuss this amalgamation question and devise ways and means as to how far such a combination is feasible and how soon it could be implemented if practicable. This appears to be one of the ways be which the existing deficiencies could be remedied. It would at the same time be appropriate if in formulating the proposals for the combined working at a central place in the district, sufficient thought is bestowed to the setting up of a permanent exhibition at each place modelled on the latest lines and incorporating the principles of public relations that are now adopted on a world-wide basis in all Information Services.

How best to translate the results of Research into General Farming Practices *

By
SRI M. KANTI RAJ
(Headquarters Dy. Director of Agriculture, Propaganda)

Introduction : The Department of Agriculture in this Province, was reorganised and constituted as a separate entity in 1905, about 44 years ago. During the early stages extending over a period of about 15 years, the activities of the department were mostly confined to planning and organizing (a) Research Sections at Coimbatore (b) Research-cum-Demonstration Farms in different parts of the country selected on a regional and cropbasis and (c) training the required personnel. This step can be justified because the Department can be of no help to the cultivator unless research is conducted and some tangible results are achieved for passing them on to the cultivators.

The Department expected that the agricultural practices adopted on the Research-cum-Demonstration Farms would be copied by the cultivators who visited them. This was no doubt achieved but only to a limited extent. The officers in charge of these farms, toured in the neighbourhood to study the local agricultural practices and gather material to form the basis for research work. In the course of their tours, they influenced the rich land-lords to take up certain improvements and therefore, they should be considered as pioneers in the spread of the results of research.

From the early twenties to the early forties, over a period of twenty years, though some sort of extension work was undertaken, the strengh of staff employed was very inadequate, with the result that the jurisdiction was very wide. Consequently the nature of work done was not intensive, and even the existence of the Department was not widely known. It was only in 1941, that an agriculture demonstrator was appointed for each taluk and a separate officer for each district. The step taken to bridge the gulf between research and propaganda, though belated, is not even a decade old. This fact has to be borne in mind in evaluating the work done by the Agricultural Department.

Methods Employed : The expectation of the Department that ryots after visiting the Research-cum-Demonstration farms would naturally copy the practices adopted, proved to be rather slow in influencing the cultivators. The main objection was the ingrained suspicion of the cultivator that the methods adopted to secure superior yields were not applicable to his means and conditions.

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* Paper read at the 32nd College Day and Conference.

The Department had therefore to think of some other method of influencing the cultivator. In the early twenties after the appointment of a special staff for extension work, the "demonstration farm" method was replaced by "demonstration plot" method. In accordance with the revised policy, the improvements were demonstrated on the cultivator's own land and he did all the operations under the Departmental control or direction. This change was found to be very effective. This type of ocular demonstration appealed to the cultivators very much. The improvements demonstrated were taken up eagerly and their natural spread was very wide. Even today this ocular demonstration method holds the pride of place among the various methods adopted for transmission of the results of research.

The other methods followed with varying amount of success are – staging dramas, composing ballads, issuing leaflets in non-technical language, exhibiting word and pictorial type of posters, displaying exhibits in places where the public gather in large numbers (e.g., Taluk Office, Sub-Registrar's Office, Munsiff's Court) staging exhibitions in connection with local fairs and festivals, delivering lectures, imparting education to sons of farmers by running special schools and also special classes, making use of lantern slides, issuing journals in regional languages, arranging talks through the Radio and contributing articles to the press. Each of these methods has contributed to the spread of the results of research, but I feel none of these can be compared with the part played by the ocular demonstration plot. To those cultivators who willingly co-operated with the Department and enthusiastically acted as non-official propagandists in influencing other cultivators, our departmental thanks are due.

Programme: The statement "Flag followed trade" which history has proved as correct in the case of some nations is familiar to us. On the same analogy, it can be stated "Improved methods followed improved seed" in the case of agricultural devolopment of our Province. Even today the easiest method of winning the confidence of the conservative calculative cultivator seems to be the introduction of improved seed, as the first step of approach and this will have to be continued.

Since 1937, we have had three distinguished foreign experts visiting India, at the invitation of the Central Government to study the present organisation of Agricultural Departments in India and suggest improvements. I refer to Sir. John Russel, Dr. Norman Dodd and Lord Boyd Orr. One common suggestion made by them refers to expansion of the extension side of the Departmental activity. They laid considerable emphasis on this suggestion.

Considering the jurisdiction of a taluk which on an avarage contains anything over 150 villages, scattered over 400 sq. miles even the present staff of one Demonstrator assisted by 2 or 3 fieldmen supervising and guiding the work of 3 or 4 maistries cannot be considered adequate. If the propaganda has to be effective, the cultivator has to be met constantly and guided in his day to day practices. This could be possible only if the jurisdiction of the staff is small. I feel, therefore, there is a strong case for increasing the existing staff employed on extension work. In a country like ours, where illiteracy is widespread, I feel the potential weapon for influencing the cultivator lies not through the spoken world or printed matter but through practical, ocular demonstration plot and visual education with the aid of cinema. Propaganda through cinema, has to be developed. There can, however, be no finality in the methods to be employed but past experience has confirmed that all other forms can only supplement but not supplant the ocular demonstration and visual education.

Utilization of Fruits and Vegetables *

By

Dr. G. S. SIDDAPPA

(Biochemist, Fruit Research Station, Kodur)

Modern researches have shown that fruits and vegetables are essential foods and contain highly protective factors such as vitamins and minerals which are indispensable for a proper diet. They are, however. seasonal and are not, therefore, available in plenty, throughout the year. During short periods of glut they are available in plenty, but at other times, they are scarce and beyond the reach of the average consumer. During these glut periods large quantities of these valuable foodstuffs often go to waste for lack of proper storage and transport and also preservation facilities. This is almost a criminal waste of Nature's bounty and a very important source of food. All the world over the importance of the fruit and vegetable preservation industry in the agricultural economy of the country has been fully realised. The industry is eminently suited for small scale or large scale working. In several of the advanced countries of the world there are many large fruit and vegetable canning factories. In addition to these, during the peak of the fruit season countless homes will be busy with the preparation of canned and bottled fruits, jams, jellies and marmalades. These little

* Paper presented for the 32nd College Day and Conference.

efforts on the part of the citizens go a long way in conserving the nation's food resources. In India, however only a small beginning has been made so for and that too only recently. It is, therefore, of the greatest importance that vigorious efforts should be made to rapidly develop fruit and vegetable preservation in this Province.

The Province of Madras is rich in horticultural resources. It is famous for its mangoes, bananas, oranges, and pineapples. We have also fairly large quantities of other important fruits, tropical as well temperate, such as papayas, guavas. jack fruit. etc. Very little effort has so far been made to preserve these on any large scale. The experiments conducted during the past six years at the Goverment Fruit Products Research Laboratory, Kodur, have shown that some of these important fruits can be preserved satisfactorily in several ways. Some of the products like citrus squashes, mango and pineapple jams, candied fruit and peel, etc., have been favourably received by the public. It is possible to work a small fruit preservation factory by a group of orchardists in different fruit growing localities as is being done in various other parts of the world, where fruit and vegetable preservation has come to stay as a stabilising force in the agricultural economy of the State.

By means of intensive propaganda and demonstration at their very doors and by providing all the necessary equipment at cheap rates, fruit preservation can be made popular throughout the country. To achieve this a small beginning has already been made by employing five trained lady fruit preservation demonstrators. These will demonstrate the preparation and preservation of simple products like fruit squashes, cordials, jams, jellies, marmalades, candied fruit, canned fruit dried fruits and vegetables etc., in girls' schools and colleges, ladies clubs and institutes, public fairs and exhibitions. In course of time, the idea is likely to catch on and create public interest in this vital subject which is indespensable for maintaining a balanced diet and also to improve gradually the standards of living.

The task, being of a pioneer nature, is naturally an uphill one. The results may be slow, but will be definite. Enormous quantities of valuable food that might otherwise go to waste would be saved for the Nation by thousands of small homes all over the country. To prevent waste in any form is as important as making two blades of grass grow where only one grew before.

The work at the Fruit Products Research Laboratory is so planned that it should one day result in fruit and vegetable preservation becoming a home routine in countless homes all over the country. The other aspect of making it a large-scale industry has also been not lost sight of. No effort is being spared in speeding up this work although the obstacles to be overcome are quite formidable.

Although a number of varieties of mangoes are grown in the Province, only Baneshan and Neelum have so far been found suitable for canning. Fortunately, these are commercial varieties and are therefore, suitable for canning on a large scale. The juicy 'Rasam' varieties can be made into mango squash. Mango jam can be prepared from many of the varieties. Pineapples, guavas, grape-fruit, plums, etc., can also be canned. Jack fruit, musk-melon and palm kernel are also suited for canning.

Jams, jellies and marmalades can be prepared easily from many of our fruits. Fruit juices, squashes and cordials, which are delicious and healthy drinks, and are in great demand in any tropical country, can be prepared by simple methods. Little known fruits like woodapple, cashew apple, custard apple etc., have been transformed into excellent products. Home-drying and dehydration of fruits and vegetables by modern scientific methods is fairly simple. Luxury articles like candied and crystallised fruits, candied citrus peels etc., can be prepared at home. Thus there are several ways in which fruits and vegetables can be prepared and preserved. To popularise fruit preservation in the country, a number of steps have been taken. A short course of three months training in fruit canning and preservation has been started at the Government Fruit Products Research Laboratory, Kodur. A number of simple and helpful articles have been published regarding fruit preservation. Radio talks have been given. Fruit products are exhibited in different Exhibitions and actual demonstration of preservation arranged. Five lady fruit preservation demonstrators have recently been employed to popularise fruit preservation the Province. Simultaneously there is a vigilant inspection staff also to see that fruit products sold by manufacturers to the public keep upto certain well-defined standards of quality. It is felt that when the work is in full swing, the laboratory achievements will gradually become practical achievements also.

Rice Culture in Other Countries and its Lesson for Madras*

By
M. B. V. NARASINGA RAO
(Paddy Specialist)

It may appear presumptuous for me to attempt to deal with rice cultivation in foreign countries about which I have no personal knowledge but I may be allowed this indulgence as it may be of interest to some of us here who have no access to libraries. I may at once begin to deal

*Paper read at the 32nd College Day and Conference.

with the culture in other lands with high acre yields of rice, bringing out the salient features which distinguish rice culture there and here without devoting any more time, on personal excuses.

It is officially recorded that the highest acre yield is obtained in Spain with an average of 5100 lb. of paddy. The area of rice in that country is 1·2 lakhs of acres, more or less equivalent to that under the Periyar basin in Tirunelveli District. The cultivation is carried on along lines similar to any of the countries in South-East Asia and it is grown mostly from May to October. But the points which distinguish the Spanish culture from other parts is (1)—A thorough cold weather cultivation. Fields are watered in January, harrowed under puddle, when dry, again harrowed, then ploughed again with mould-board ploughs when in condition. Later it is puddled under water in May before planting. (2)—The use of considerable quantities of suitable nitrogenous and phosphatic manures – 240 lb. Ammonium sulphate, 300 lb. of super phosphate and 100 lb. of Potassium sulphate in addition to green manures which are grown without exception on all the areas. (3)—A very liberal but graduated use of water when necessary. No machinery is used, unlike as in the U. S. A.

In Italy which has 4 lakhs of acres under rice, the yield is 3600 lb. of paddy. Here rice is a rotation crop with other cereals and legumes. The area is laid on level fields 20 to 30 acres in extent, so that tractors are used for dry ploughing. Puddling is again done by tractors drawn by horses. Though most of the area is broadcast or drilled, the Italians have fully understood the beneficial effects of transplanting and are trying to evolve a transplanting machinery due to cost of labour. Water is liberally but economically given. Very heavy dressing of farm yard manure combined with artificials are used. Artificial desiccators are developed to dry grain so as to reduce losses in storage.

Bulgaria still uses the wooden husking machine, called 'Dinki' a corrupt form of the 'Dhenki' a levered horizontal beam used in North India.

Coming to the countries in South-East Asia where the bulk of the rice is grown, Japan and China record high acre yields. Japan, called the land of Bounteous Rice Crops has an extent of 8 million acres with an average acre yield of 4000 lb. of paddy. On the whole it is a rugged mountainous land and its hillsides have been terraced and brought into service to an extent unrivalled in any part of the world except probably the 'Ingorots' of the Philippines. The whole of the Japanese culture is what may be termed 'hoe farming', ploughs and animals being scarce. The soils are inherently not very rich but are made rich every year by strenuous work; application of manures and

judicious and systematic use of irrigation water from every river and suitable reservoirs. The quantity of artificials used will stagger us — upto 100 lb. of Nitrogen 60 lb. of $P_2 O_5$. In Japan as well as in Southern China paddy fields are kept absolutely clean. Green manures specially *Astralagus sinensis* is raised on 75 percent of the area. The use of certified seeds adds its little quota to the increased yield. Short erect varieties, not large in number, are sown to prevent wastage. Before sowing seed, all light or imperfect grains are removed by soaking in salt solution of 1·3 percent specific gravity. The yields now obtained in Japan are said to be double that of those prevailing 50 years ago and all this is brought about by practising intensive methods of manuring and irrigation and use of improved seed. The season is from June to October during which period only moderate rainfall is received, though this is uniformly distributed.

China: The outstanding feature of China rice culture is the use of fertilizers. All offal, of man and beast from city and country, is collected, stored without waste by leakage or by evaporation, allowed to ferment and decay and applied in a liquid form, to the land in small quantities so that none be lost and timed to the needs of the plant. It is applied intensively to the nurseries and the remainder to fields. Thus only this incessant and meticulous care, has made it possible for the Chinese to raise rice 'for ever'; two crops in the same year on most of the lands. The average yield here is 2,500 lb. per acre.

Java has the best developed irrigation system for rice cultivation. The soils are rich and rice is rotated usually with dry crops—maize, groundnut, or tobacco. The yield is about 2,000 lb. per acre; and here the poverty of the cultivator just as in India is a drawback for higher production. In this country an interesting industry in its relation to rice growing is fish culture. The spawn of gold fish is actually planted in rice fields and this industry provides an ideally cheap and easy source of proteins.

The cultivation of rice in the other countries Siam, the Philippines and Malaya is on very similar lines to India. The yields are poor. Much of the land in the Philippines suffers from too many weeds. There is no systamatic practice of fertilising the fields. Malaya suffers from uneven distribution of rainfall and the area is scattered in different parts of the country. Fertilising with artificials is seldom practised.

United States: The rice cultivation in this country is an example of cultivation where machinery is substituted for human labour as it is highly paid and hard to hire at any price. Hence rice is raised with the least possible use of human labour or animal labour. Almost all the rice land is ploughed up with large tractors. The usual practice is to plough, double disc and then drill the seed. Recently seed is being broadcast

in water by æroplanes. Sowings are done in May. Lands are usually given rest to control weeds as there is no other way and this improves the fertility. Manuring with artificials is also practised on an extensive scale. Rice is cut with binders and it is found that in this practice the losses vary from 10 to 15 percent. The cut bundles are usually shocked to cure as the grain is usually cut before it is fully ripe. The shocks are then taken to the thresher commonly called separator on bundle wagons drawn by horses or by motors. The sacks from the separator are moved by 'banking-out-wagons' to warehouses and some go directly to the mills. The average yield is about 2500 lb. of grain per acre.

In recent years it is reported that rice cultivation is extending in Australia and areas which are unfiit for any crop are brought under rice with irrigation. Here also most of the cultivation is done by machinery and the cost of cultivation is reported to be very high.

It is thus seen that in many countries the acre yields are very high and sometimes there are twice ashigh as in Madras. Why is this difference? Apart from such factors as the low standard of the actual cultivator, absentee landlordism, inadequate manuring etc, the major difference is the total climatic and ecological factors that differentiate countries like Spain, Italy and even Japan from those of India during the rice growing period. In these rice is more or less an autumn crop with adequate irrigation, favourable for greater root development and production of large amounts of dry matter. In India, most of the rice is grown in the monsoon months where not enough sunshine is available and the high percentage of humidity promotes vegetation at the expense of grain formation. Rice crops grown in the autumn months in the Madras have also given average yields of 4000 lb. over extensive areas. The cultivator in our country is in no way inferior to his compatriot in any part of the world in the job of producing crops. He is of course, illiterate, and not able to follow recent scientific developments, poor and hence not able to give adequate monetary attention to his land.

The following facts emerge from the brief outline of rice cultivation given above. These are nothing very new but their repetition may be excused because of their vital importance to the rice industry.

(1) The rice crop must be made less dependant upon the monsoon by adequate storage tanks. Areas under autumn (kar) and spring (Navarai) cultivation should be increased by more wells and tanks and cheaper power for lifting water. Rice pays for larger and assured irrigation, by (i) longer crops, (ii) more uniformly good crops, and (iii) by making two crops a year safe where only one can be grown without it.

(2) Extended use of all organic wastes; half-decayed straw and compost is found to be particularly suitable in heavy soils.

(3) Greater production and use of artificial manures with green leaf and where it is necessary, with cheap lime.

(4) An extended use of catch and cover crops of legumes. Introduction of pis-ci-culture in rice fields where feasible.

(5) Greater and closer attention to seed distribution methods. The full benefits of intensive rice cultivation are realised only with good seed improved by breeding. A central Seeds Organisation may well be worth consideration.

(6) Research for greater use industrially of waste products of rice as in Japan

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Pastures of the Kangayam tract

By

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Introduction: Among the different breeds of cattle in India, the Kangayam breed is one of the efficient and scientifically bred animals (3). These are bred mainly in the Kangayam firka in Dharapuram Taluq of Coimbatore district and to a small extent in parts bordering on Erode and Gobi taluqs. The development of this breed has so far been carried on by enterprising well-to-do ryots, the Pattagar of Palayakottai being the foremost. The aforesaid ryots own extensive areas of well organised pastures, the Kangayam tract particularly being one with such good private pastures (2) which might be said to be responsible for the development of this famous breed of the tract.

Maintenance of Pastures: *Fencing*: The large blocks of land owned by the breeders are divided into smaller blocks by live-fencing. These fences facilitate controlled grazing by animals and form an effective protection against their straying away from one block to another, besides functioning as wind breaks. The most effective, popular and easily raised fence is *Commiphora berryii*, Engl. (Mul kiluvai) which is propagated by cuttings. With the beginning of South-West Monsoon, the existing fences are strengthened and new ones are put up. Holes are made by means of crowbars, the cuttings planted into these and are covered. The cuttings are put at least in three alternating rows which establish within a month and form a good live-fence in a short time. *Euphorbia antiquorum*, Linn. (Sathurakalli or Thirugukalli), *E. tirucalli*, Linn. (Tirukalli or Kolkalli), *Agave americana*, Linn. (Railway kathalai) *Azima tetracantha*, Lam. (Sangam mulchedi) are among some of the other fence plants arranged in the order of their respective importance.

(ii) *Cultivation of Grasses*: Great care is being taken for maintaining a good stand of *Cenchrus ciliaris*, Linn. (Kolukattai pull) in the pastures and in fact, this is the only species of grass which is actually cultivated for grazing purposes, although there are quite a large number of other grasses which grow naturally in the pastures. *Cenchrus ciliaris* forms the staple pasture and fodder grass for the Kangayam breed of cattle (1). When a field is to be brought under this grass, 2 to 4 ploughings are given with a country plough in the favourable season and the seeds are sown by broadcasting either pure or as mixtures with cholam or cumbu. 10 to 15 lbs. per acre is the seed rate adopted and the seeds are not usually covered. The seeds germinate within 5 days and in about 3 months, the grass attains a height of 2 to 3 feet with profuse tillering in average soils. Animals are let in for grazing only six months (and some times one year) after the sowing, by which time the underground rhizomes are well formed and the grass is established. Though it dries upto the bottom in the summer, being perennial and rhizomatous it revives remarkably and quickly with the rains yielding plenty of green herbage.

(iii) *Grazing*: Ten to twenty days after the monsoon rains, when there is young green flush, calves are let in for grazing as they do little harm to the growing grass. After the grass has put in good growth, the bigger animals are let in, in definite numbers and are allowed to graze for particular periods taking care to see that the pasture lands are not overgrazed. The systematized and controlled grazing practised in this tract helps to a great extent in the maintenance of pastures which are often left as permanent grazing grounds for many years.

Cultivation of legumes and trees: Besides the valuable grass, *Cenchrus ciliaris*, the important leguminous forage plant, *Phaseolus aconitifolius*, Jacq. (Naripayathan kodi) is regularly raised in the pastures year after year. Though an annual it enriches the pastures and are greatly relished by cattle both when green and dry. Very often this species along with *Phaseolus trilobus*, Ait. (Siru naripayathan kodi) the common pillipesara, comes up from the self-sown seeds of the previous year and afford a nutritious feed for the grazing animals. There are also a good number of other leguminous plants occurring naturally with the grasses.

Trees except *Acacia leucophloea*, Willd. (white babul; velvela maram) are encouraged to grow inside the pastures. Sowing of the babul seeds is usually done during South-West Monsoon and within 5 or 6 years they grow into trees giving enough shades for the resting animals, mitigating the force of the westerly strong wind and above all yielding valuable pods which are eaten by animals during the hot summer months. The pods mature in, in February–March and as they drop from the trees, the cattle feed on them. Besides, they are also collected by ryots, pounded into coarse powder and substituted for cotton seed and

bran. *Acacia leucophloea*, Willid. is perferred to *A. arabica*, Willd. (the common babul) as the pods of the latter are relished only by goats and not by cattle. Further it comes up much better than the latter in laterite rocky soils common to this tract.

Natural Pasturage: The plants which are found in the pastures of the Kangayam tract and which form the natural feed for the cattle can be grouped as (a) pasture grasses and (b) browse plants.

(a) *Pasture grasses*: There are over forty-five grasses both annuals and perennials which grow naturally in the pastures along with predominant perennial *Cenchrus ciliaris* (Kolukattai grasses). Many of these grasses are relished by cattle and only a few like *Aristida depressa* Retz. are generally left untouched. The annuals come up with the rains of the North-East Monsoon in October–November, seed in December–January and dry up afterwards. The perennial grasses have a green flush in July–August if there are enough South-West Monsoon rains. These are usually benefitted by the North-East Monsoon rains and remain green upto January–February after which period, they are alive only under the ground and revive again with the rains of the next season.

Perennial grasses: Twenty-four species of perennial grasses were recorded in this tract. *Chrysopogon montanus*, Trin. is the second important grass (the first being *Cenchrus ciliaris*) and is followed by *Cenchrus setigerus*, Vahl. (Black kolukattai), *Cynodon dactylon*, Pers. *Cynodon dactylon*, var *intermedius* C. E. C. Fischer. (Hariali or doob grass), *Dicanthium annulatum*, Stapf. and *Chloris barbata*, Sw. *Chrysopogon montanus*, Trin. is a very drought-resistant grass coming up well in sandy and stony places. Other species like *Enteropogon monostachyos*, Schum., *Apluda aristata*, Linn., and in rocky areas *Cymbopogon caesius*, stapf., *Themeda triandra*, Forsk., *Eragrostis bifaria* Wt., are often met with. The well known grasses such as *Heteropogon contortus*, Roem & Schult. (Spear grass), *Sehima nervosum*, Stapf., (Nendra gaddi) and *Iseilema laxum*, Hack. (Chengali gaddi of Ongole tract) are rare in this tract and are found as stray clumps here and there *Chloris barbata*, Sw. (Kuruthu pul) is widely distributed in different kinds of soils. Rooting at all nodes, it is often a weed in garden land and tolerates alkalinity, though it is poor in growth under such conditions it is the only grass coming up in saline patches.

Near wet areas around Gobi and Bhavani taluqs, *Ischaemum aristatum*, Linn., *Panicum repens*, Linn., and *Eriochloa procera*, C. E. Hubb. are the dominants. *Panicum repens*, Linn. which is known as Ingi-pillu or anai arugu is a hardy plant coming up well in all kinds of soil near moist places. Because of the stoloniferous habit it tends to become a nuisance in cultivated field near channels. The cattle relish this grass and it is supposed to stimulate milk yield. *Ischaemum aristatum* and *Eriochloa procera* are mainly cut and fed to milch cows.

Annual grasses: Twenty-three annual species were recorded and most of them in areas with plenty of moisture as in wet-land cultivated tracts of Gobi and Bhavani. *Echinochloa colona*, Link., *E. crus-galli*, Beauv., *Brachiaria ramosa*, Stapf. *B. distachya*, Stapf., *Urochloa reptans*, Stapf. and *Ischaemum rugosum*, Salisb., are important among them. In garden lands and in shaded places near hedges species like *Dactyloctenium aegyptium*, Baauv., *Setaria verticellata*, Beauv., *Eleusine indica*, Gaertn., and *Digitaria marginata*, Link., occur quite frequently. *Brachiaria eruciformis*, Griseb., and *Trachys muricata*, Stend., are common annnals coming up after rains in black cotton and sandy soils respectively.

(b) *Browse plants*: The richness of the pastures of the Kangayam tract is due to the presence of a good nnmber of plants both leguminous and non-leguminous which grow with the grasses. There are nineteen such plants which have been observed to be growing naturally in the pastures, in addition to the cultivated legume *Phaseolus aconitifolius*, Jasq., (Naripayathan kodi). This is the only legume cultivated in the pastures and is also grown as a pulse and a supplemental fodder in dry lands. *Phaseolus trilobus*, Ait. (Panipayar or Pillipesara) and *Indigofera enneaphylla*, Linn., (Seppunerinji) are the other two important legumes followed by *Alysicarpus* and *Rhynchosia*. Among the non-legumes, amarantaceous plants as *Digera arvensis*, Forsk, *Celosia argentea*, Linn. *C. Polygonoides*, Retz. and *Allmania nodiflora* R. Br. are the common ones. The convolvulaceous *Merremia tridentata*, Hallier., *Ipomoea pes-tigridis*, Linn and are greatly relished by cattle to some extent. The other plants which are eaten by cattle are *Boerhaavia diffusa*, Linn. *Nyctaginaeceae*), *Tridax procumbens* (*Compositae*) *Physalis minima*, Linn. (*Solanaceae*), *Borreria hispida*, K. Sch. (*Ruciacaeae*) and *Commelina benghalensis*, Linn. (*Commellnaceae*). In times of great fodder scarcity as in prolonged summers, the leaves of *Borassus flabellifer* (Palmyra) is fed to animals and forms an important famine fodder.

II. NOTES ON NATURAL PASTURAGE.

Perennials :

1. *Cenchrus setigerus*, Vahl. (Kolukattai grass-black) Tamil: Karuppu Kolukattai pull. Though this is not found so commonly as *C. Ciliaris* is next of importance in fodder value.

2. *Chrysopogon montanus*. Trinn. Tamil: Chola pull; Telugu: Adavi soma gaddi. The second commonest grass after *Cenchrus ciliaris* in the dry tract coming up well in sandy and stony soils. It forms a good fodder grass for the animals before flowering. By March—April when the grasses dry up, the yellow thin culms devoid of the spikelets which fall off are grazed by cattle.

3. *Cynodon dactylon*, Pers. Hariali or Doub grass. Tamil: Arugampull: Telegu: Gericha gaddi, Kanarese: Kuddi garika. Perennial with deeply penetrating underground root-stocks and growjng to 6 to 9 inches. It is often a very bad weed in cultivated field with heavy soil. The grass is relished by horses and sheep.

4. *C. dactylon* Pers. var *intermedius*, C.E.C. Fish, similar to the above but prefers slight moisture conditions and puts-forth better growth.

5. *Amphilophis pertusa*, Stapf. Tamil: Chinnakarai pull, Chevoarugam pull; Telegu: Genjulu. A well spreading grass coming up well in loams, but found in all soil conditions and forms an excellent green feed.

6. *Dicanthium annulatum*, Stapf. Telugu: Molava gaddi. A tufted grass found in good loams. Highly relished by cattle, but rather rare.

7. *Chloris barbata*. Sw. Tamil: Kuruttu pull; Telugu: Uppu gaddi. Widely distributed on all soils, rooting at nodes and is often a weed in garden lands. It has a virtue namely it tolerates alkalinity in soil. Cattle feed on them readily.

8. *Enteropogon monostachyos*. Schum. Tamil: Kannai pull. It grows upto 3 feet with erect and tufted stems arising from a woody root-stock. It is found scattered in some places and forms a good fodder.

9. *Iseilema laxum*, Hack. Tamil: Thenganari pul; Telugu: Erra chengali gaddi. This occurs as stray clumps with short creeping root-stock. A good fodder grass.

10. *Eremopogon foveolatus*, Stapf. Grass growing in clumps with plenty of foliage and prefers calcareous soil. Fairly abundant and is one of the best fodder grasses.

11. *Apluda aristata*, Linn. Tamil: Malam pul, Manda pul. Telugu: Bura kanchi; Kanarese: Akkii Hubbu. Tall leafy grass. Coming up well on hills and near hedges, but not common. Fairly good fodder.

12. *Eragrostis bifaria*, Wt. Telugu: Nakka piththu kaseru, Gubbikal Gaddi; Kanarese: Modi Mara Hullu, Nosaihullu. A Slender grass growing in dry rocky and gravelly area. Cattle graze this readily.

13. *E. plumosa*, Link. Slender grass readily grazed by cattle but the quantity of forage is better and the grass is also not common.

14. *Sporobolus coromandelianus*, Kunth. Short stumpy and tufted grass common on poor soils but a poor fodder.

15. *Heteropogon contortus*, Roem and Schult. 'Spear grass' Tamil: Oosi pul: Telugu; Ooba gaddi, Pandi mullu gaddi; Kanarese: Ankari Hullu. Densely tufted grass which stands drought well and though not common. It is found on hill sides. A good fodder when young and green but not touched by cattle after flowering due to the presence of long awns. Cattle graze the grass after the awns drop off. It forms a good hay crop.

16. *Sehima nervosum*, Stapf. Telugu: Nendra gaddi; Kanarese: Nalai huilu. Though not common in the tract, it is found in stray places near hills and grows in clumps with large number of tillers. It grows to about a foot in height in this area and is highly relished by cattle. If only this could be cultivated it will form one of the best fodder grasses.

17. *Themeda triandra*, Forsk. Tamil: Erigai thattu pul. Telugu: Pedda yerra kalla kasuri. An erect, tall growing, coarse grass, eaten by cattle only when young and occurring on dry hilly areas.

18. *Aristida hystrix*, Linn. f. Diffuse and branching grass, found common in the hilly dry and gravelly areas but not eaten by cattle.

19. *Aristida setacea*, Retz. Tamil: Thodappan pul. Tall and coarse grass used in making brooms. Not eaten by cattle.

20. *Ischaemum aristatum*, Linn. An erect and decumbent grass common in wet areas around Gopi and Bhavani. It is usually cut and fed to animals.

21. *Panicum repens*, L. Ginger grass. Tamil: Inji pul Anaiarugan; Telugu Lada or Karigaddi; Sonti Hullu. The grass is found in moist and wet areas in both sandy and clayey soils. It has hardy stoloniferous rhizomatous stems. The cattle relish it well; and it is said to stimulate the yield of milk.

22. *Eriochloa procera*, C. E. Hubb. Tamil: Karunganni pul. Another grass found along the irrigation channels in paddy fields in Gobi and Bhavani and readily eaten by cattle.

23. *Enneapogon elegnas*, Stapf. This is a slender erect grass growing 3-12 inches. Though fairly abundant, this is not relished by cattle.

24. *Cymbopogon caesius*, Stapf. Tamil: Vella Mungan pul. Kamatchi pul; Telugu: Kasigaddi; Kanarese: Kasi hullu. An erect grass, coarse and with a strong odour occuring on hills but not eaten by cattle.

Annuals:

25. *Dactyloctenium acgyptium*, Beauw. Tamil: Maththangi pul. It is a prostrate plant with stems rooting at the nodes. Though it comes under all conditions, it prefers loamy garden soil. Cattle eat them well.

26. *Andropogon pumilus*, Roxb. Tamil: Kaththiri pul. Fairly common in the black soils and relished by cattle before flowering.

27. *Trachys muricata*, Steud. Tamil: Karuvattu pul or Sani velam pul. Telugu: Pedda utla gaddi. This grass grows abundantly in sandy areas soon after rains and forms a very good fodder.

28. *Perotis indica*, O. Ktz. Tamil: Narival pul, Kudiraival pul; Telugu: Boosara gaddi, Nakka toka gaddi; Kanarese: Nari Meesai hullu. A small grass with a prominent and characteristic inflorescence. Grows in rocky and gravelly areas. Does not form a good fodder though animals graze on them.

29. *Urochloa reptans*, Stapf. Tamil: Shani pul. A slender prostrate annual found on heavy, moist soils and is liked by cattle.

30. *U. setigera*, Stapf. Much bigger than the former species and greatly relished by cattle.

31. *Brachiaria eruciformus*, Griseb: Telugu: Dhoma Kalugaddi. A common grass in the black soil areas of the tract and often found near fences. The forms small tufts with slender spreading branches and is readily eaten by cattle.

32. *Brachiaria ramosa*, Stapf. Tamil: Sommai pul; Tel. Eduri gaddi; Kanarese: Kodu Baragu hullu. One of the best fodder grasses growing in abundance after the rains. The stems are stout and ascending from a creeping base and are relished by cattle.

33. *B. distachya*. Stapf. Telugu: Kotanna gaddi, Kanarese: Hambu haraka hullu. A fairly common grass of the tract in loamy soils. Does not thrive in rocky areas. Forms a good fodder.

34. *Eragrostis ciliansis*, Link. Often found as a weed in dry and garden lands. Cattle relish it.

35. *Eleusine indica*, Gaeutn. A tufted grass growing in moist areas after rains. It is readily grazed by cattle.

36. *E. lagopoides*, Merr. Found in alkaline, wet places and well spreading. Cattle don't relish it.

37. *Dinebra retroflexa*, Panz. Occurs in alkaline loams. Cattle relish it before flowering.

38. *Setaria pallidifusca*, Stapf et Hubb. Tamil: Korattu pul; Telugu: Korattu pul; Telugu: Kuradakori gaddi.

39. *S. Verticellata* Beauv. Tamil: Korattu pul. Slender tufted grasses occurring in shades near fences. Cattle graze on these readily.

40. *Alloteropsis cimicina*, Stapf. Tamil: Chena pul; Telugu: Bottanpala gaddi; Kanarese: Neru sajjai hullu. Though this is not found very commonly in the tract, it was found to be in good proportions with other grasses in few pastures around Gobichettipalayam and Udumalpet and are readily grazed by cattle.

41. *Echinachloa colona*, Link. Tamil: Karumpul, Varsanam pul, Telugu: Otha gaddi.

42. *E. Crusgalli*, Beauv. Tamil: Oothu pul; Telugu: Pedda otha gaddi. These grasses grow as weeds with paddy in paddy fields and are cut and fed to animals which relish them very much.

43. *Paspalidium flavidum* A. Camus. Tamil: Arisi pul; Telugu: Uda gaddi. A very good fodder grass growing in low lying moist areas, but not common.

44. *Digitaria marginata*, Link. var *fimbriata* Stapf. Tamil: Kakkai kal pul. A decumbent grass with long flowering culms and often found as a weed in garden lands.

45. *Tragus biflorus*, Schult. Tamil: Ottupul. A low spreading grass thriving in dry sandy localities. Though common cattle do not readily eat them.

46. *Aristida depressa*, Retz. A tufted grass rarely attaining more than one foot high and common on poor soils, but cattle do not eat this.

47. *Ischaemum rugosum*, Salisb. An erect plant found along wet land bunds and in shaded areas near fences. Cattle feed on them.

Browse Plants: i. *Legumes:*

48. *Phaseolus aconitifolius*, Jacq. Tamil: Naripayathan Kodi, Thulukkappayar. The only legume cultivated in the pastures for grazing and on dry lands as a pulse and a supplemental fodder. It is a long trailing plant and requires fairly good soil. Relished by cattle both when green and dried.

49. *Phaseolus trilobus*, Ait. Tamil: Passipayaru, Sirunaripayathan kodi. Telugu: Pillipesara. A variable plant found in all kinds of soils either poor or rich and encouraged to grow in the pastures. It appears year after year from self sown seeds and forms a nutritious food.

50. *Indigofera enneaphylla*, Linn. Tamil: Seppu neringi. A common and very important perennial with thick root stock and spreading habit. Enriches the pastures and is greatly relished by cattle.

51. *Rhynchosia minima*, Yc. A slender trailing or climbing plant which is encouraged to grow in the pasturers and readily grazed by cattle.

52. *R. Capitata*. A bigger plant than the former, but rare.

53. *Alysicarpus rugosus*, Dc. Tamil: Nama poondu. An erect herbaceous annua with moderate foliage and well relished by cattle.

54. *A. rugosus, Dc. var. styracifolius*, Baker. Tamil: Sirunama poondu. A smaller form of the above-mentioned species, but quite common in heavy black soils.

55. *Crotalaria globosa*, W and A. Tamil: Ponnai kattai kodi. A very common trailing annual coming up even in poor soils and forms a fairly good fodder.

ii. *Non-Legumes.*

56. *Digera arvensis*, Forsk. (Amarantaceae) This is an annual herb with prostrate branches found as a weed in cultivated lands, waste places and also in pastures. This is a greatly relished by cattle. The leaves are used as a green vegetable by poor people.

57. *Celosia argentia*, Linn. (Amarantaceae) Tamil: Ponnai kerai A very common plant which grows to 3 to 5 feet, often allowed to grow with cholam with which it is harvested and stacked. After 2 or 3 months, both are shaffed together and fed to animals which relish them. Cattle also brouse on the leaves and tender portions of the plant.

58. *C. polygonoides*, Retz. Tamil: Elikattu keerai. Another common amarantaceous plant similar to *Digera arvensis* but found in dry and poor soils and readily broused by cattle.

59. *Allmania nodiflora*, R. Br. (Amarantaceae) This is a perennial with stout roots stock. The herbaceous branches are relished by cattle.

60. *Aerva tomentosa*, Forsk (Amarantaceae) It is a white tomentose plant common on road sides, rocky and gravelly areas and in cultivated field. It is eaten only by goats.

61. *Boerhaavia diffusa*, Linn. (Nyctaginaceae) A common weed in dry localitie- and on field bunds with stout root-stock and many procumbent branches which are eaten by cattle.

62. *Merremia tridentata*, Halliei f. (Convolvulaceae) Tamil: Savuli kodi. A perennial herb with long slender prostrate branches greatly relished by cattle.

63. *Ipomoea pes-tigridis*, Linn. A hairy climber readily broused by animals.

64. *Tridax procumbens*. Tamil: Orambuppondu. A common compositae found in all kinds of soils and greatly relished by buffaloes. When fresh and green after rains, cattle also feed on them.

65. *Physalis minima*, Linn. (Solanaceae) Tamil: Natuthakalli. Telugu: Budama aakku. A succulent herb growing after rains and easily made out by the inflated accrescent calyx. Cattle eat these readily.

66. *Borreria hispida*, K. Sch. (Rubiaceae) Tamil: Naththa choori Telugu: Mathana aakku. A herb with long procumbent branches and broused by cattle.

67. *Commelina benghalensis*, Linn. (Commelinaceae) Tamil: Valukkai poondi. A slender herb with creeping stem which root at lower nodes. Common on red loams and greatly relished by cattle.

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Extracts.

Adoption of measures for the improvement of cotton yield in Madras (From The Director of Agriculture)

The following article entitled "World cotton production record is claimed by S. C." by A. B. Bryan, former Agricultural Editor, S. C. Extension Service, U. S. A., which appeared in a recent issue of "The Cotton Trade Journal" is for information:—

"World Cotton Production Record is Claimed by S. C." Chester County Farmer gets 3·3 bales per acre in 1946. (By A. B. Bryan, former Agricultural Editor, South Carolina Extension Service)

(In the April 30 issue of THE COTTON TRADE JOURNAL, Victor Schoffelmayer, widely known cotton and chemurgic expert, described a cotton-growing contest, in Texas in 1925 when G. Mont Adams, Amith County farmer, produced 1,612 pounds of lint per acre. To his knowledge, Mr. Schoffelmayer observed, this record has never been surpassed.

No So, says H. G. Boylston, cotton improvement specialist of Clemson; S. C. Mr. Boylston forwarded us the following story about J. Harvey Neeley, Chester County, S. C. farmer, who in 1946 grew 1,655 pounds of lint per acre to take first prize in that state's annual 5—acre contest).

The South Carolina Five-Acre Cotton Contest, which has been a powerful factor for twenty years in increasing per acre yields and improving the length and quality of lint, reached in 1946 its highest pinnacle in production per acre and in percentage of lint one inch or more in staple length.

The winner of the first state prize, J. Harvey Neeley, made on five acres 8275 pounds of lint, or 3·3 bales per acre; the eight state and district prize winners average 1,122 pounds of lint per acre; and the 628 contestants averaged 602 pounds of lint per acre.

In the matter of staple length, improvement has been so noteworthy that in 1946, 100 per cent of all cotton produced in the state was 15/16 inch or longer, and 98·2 per cent was one inch or longer.

Harvey Neeley's Feat: Intensely proud but entirely free from vainglory is John Harvey Neeley, Chester county, who broke the all time cotton production record in South Carolina with his 8,275 pounds of 1-1/8 inch lint and won state prize of $ 750.

Neeley's average yield of 1,655 pounds of lint per acre is probably the record also for the entire South's Cotton Kingdom Certainly it is a feat for this youngish farmer with only a few years of experience in farming independently since his father's death three years ago.

Neeley's contest cotton was grown on well drained field of Iridel (black jack) soil; which had been planted to cotton yearly some 20 years, with liberal quantities of stable manure each year from the nearby stables, with, of course, plenty of commercial fertiliser intelligently applied by Harvey's late father.

Secret of Success: Harvey Neeley's "secret" of success with his cotton production is really no secret. He sets it down thus: (1) the best variety available—he used Coker 100 Wilt Resistant strain 8: (2) lots of plants per acre—hills 12 inches apart on rows on 32 inches wide; (3) liberal liming and fertilizing with insistence on potash in plenty; and (4) "garden-like" attention in cultivation—"not harm a stalk". "But", he insisted, "I never could have done it without the Lord's help in providing a fine growing season".

Just a word more on Harvey Neeley's methods of production. The Iridel loam soil had 400 pounds of ground limestone each year for five years. It had abundant organic matter because of the annual applications of stable manure.

5 Per Cent Ceresan: In immediate preparation, cotton stalks were ripped out the land was fertilized with 1,200 pounds of 4—8—8 per acre, broadcast, dragged and ridged in late March. The seed, planted April 11—13, was treated with 5 per cent Ceresan. On June 3 a top-dressing of 100 pounds per acre of muriate of potash 100 lbs, nitrate and on June 17 to a top-dressing of 100 pounds per acre of 32·5 per cent ammonium nitrate and 100 lbs. muriate of potash".

2. This crop was grown as a part of a prize competition, in which the cost of cultivation was perhaps of no consideration. The cotton was grown on 5 acres of well-drained black soil which had been planted to cotton yearly for some 20 years with liberal quantities of stable manure each year and plenty of commercial fertilizer. Prior to the year in which this record yield was harvested, the land had received 400 lbs. of ground limestone per acre for five years. In the year under report, the land was fertilised in late March with 1,200 pounds per acre of 4—8—8 manure mixture, containing nitrogen, phosphoric acid and potash in this ratio and the seed, after treatment with the fungicide-ceresan, was sown in the second week of April. In addition, the following manures were also applied:—

Date	Manure		Quantity applied per acre
3rd June	Muriate of Potash (contains 46—58% of Potash)	...	100 lbs.
	Nitrate (Probably Nitrate of Ammonia)	...	100 lbs.
17th June	Ammonium Nitrate (32—5% N)	...	100 lbs.
	Muriate of Potash	...	100 lbs.

3. It will be seen that the crop not only benefitted from the residual effects of manure applied in previous years, but it also received the undermentioned quantities of Nitrogen, Phosphoric acid and Potash in its life time:—

N	...	113 lbs.	per acre.
P_2O_5	...	96 lbs.	
K_2O	...	200 lbs.	

With this treatment this 5 acre crop gave an average yield of 1,655 lbs. of lint per acre (—4·2 bales of 400 lbs.)

4. It is perhaps desirable to conduct similar competitions among cultivators in the different tracts of this country. If the cotton Committee approves of the idea, the provinces and states will be invited to submit schemes for such contests indicating the required aid from the Committee.

A Short Note on the Manuring of Cotton at the Agricultural Research Station, Koilpatti: Manurial experiments were conducted on this station from 1903 onwards to guage the increase in yield that could be obtained by applying various manures like cattle manure, cakes and chemical fertilizers. Results showed that both cotton and cereals respond to the application of nitrogen in any form. Trials with Farm Yard Manure collected by the various systems viz., loose-box, byre and heap were done on crops—cotton, cumbu and irungu from 1903 and continued every year till 1912. The

response to the application of 10 cartloads of manure was increase in yield in cotton by 50 to 75%. Neem cake at 1,000 lbs. per acre i. e., 50 lbs. of nitrogen increased the yield of cotton by 50%. Residual effect was noticed on the succeeding crops also. Results of trials with Ammonium Sulphate at 20 lbs. per acre during 1921—22 revealed that cotton yields could be increased by 13%. Systematic trials with Ammonium Sulphate and Groundnut Cake were conducted during the years 1929 to 1935 on cotton and cereals. Two cwts. of ammonium sulphate applied direct to cotton increased the yield by 40% while 500 lbs. of groundnut cake increased the yield by 35%. Residual effect was invariably recorded in the subsequent cereals—cumbu or irungu.

2. Manurial experiments with groundnut cake and ammonium sulphate in various doses were conducted on cotton during the years 1943—44 to 1945—46 as recommended by the Indian Central Cotton Committee. Cotton responded to manuring in six trials out of seven. With increase in dose of manure increased yields were obtained. The yield results and the economics of manuring are presented in table I attached. By applying 100 lbs. N. per acre the yields could be increased by cent per cent. Doses higher than 40 lbs. nitrogen left a residual effect which resulted in significantly higher yields in the succeeding cereal crop. It can be seen from the table that the ryot will get an additional income of Rs. 60 - to 92 by applying nitrogenous manures at the rate of 80 lbs. Nitrogen and Rs. 114 to 147 by applying a dose of 100 lbs. Nitrogen per acre. By applying manures direct to cotton, the ryot not only benefits himself but also helps in increasing the production of cotton and the food crop. It has been found that the ryots get more income by applying manure direct to cotton than by applying to cereals. The economics of applying manure direct to cotton and direct to cereals is worked out and presented in table II.

3. The response of cotton to direct manuring is not unknown to the ryot. Well-to-do ryots manure their cotton crop by sheep-penning. It is only the non-availability of manure which prevents them from manuring their cotton crops. They apply all the cattle manure to the food crop, and so cotton crop is left without any manure. If sufficient manure is made available to the ryot, he can be persuaded to manure his cotton crop as well. Since the effect of manuring is spectacular, only initial propaganda is necessary to make him apply fertilizers to cotton.

4. Competitions in the cultivation of cotton by the institution of prize for the best crop in each taluk would be an incentive for the ryots to pay greater attention to cultivation. It would also enable the Department to know the highest acre yield that would be possible in the different cotton tracts.

TABLE I

Treatments	Mean yield per acre in lbs. — Residual effect 2nd year. Cotton kapas	Cumbu grain.	Irungu straw.	Extra yield over 'No manure' in lbs. — Direct on cotton residual effect on cereals: Cotton kapas 1st yr.	Value @ 0-6-6 per lb.	Cumbu grain 2nd yr.	Value @ 8 lbs per Re.	Irungu straw 2nd yr.	Value at 80 lbs per Re.	Value of manures and application	Net profit due to manuring, Cotton 1st year + cumbu 2nd year	Cotton 1st year + irungu 2nd year	Remarks
					Rs. A. P.		Rs. A. P.		Rs. A P.	Rs .A .P.	Rs. A. P.	Rs. A. P.	
Manure	492	341	4461										
Amonium sulphate to supply 20 lbs. nitrogen.	625	352	4461	133	54—1—0	11	1—6—0	459	5-12—0	18-15—0	36—8—0	40-14—0	
Do. 40 lbs.	676	377	4898	184	68—8—0	37	4-10—0	897	11—3—0	36—2—0	37—0—0	43—9—0	Average of 3 years seven trials on cotton.
Do. 60 lbs.	711	543	5450	219	89—0—0	112	14—0—0	1949	18—2—0	53—5—0	49-11—0	53-13—0	
Do. 80 lbs.	834	574	6664	321	130—7—0	206	25-12—0	2652	33—2—0	70-12—0	85—7—0	92-13—0	Average of 2 years
Do. 100 lbs.	1055	604	8976	410	166—9—0	318	39-12—0	4623	57-13—0	87-15—0	118—6—0	136—7—0	Average of 1 year.
Groundnut cake to supply 20 lbs of nitrogen	602	359	4546	110	44-11—0	48	3—8—0	844	10—9—0	18-10—0	29—9—0	36-10—0	
Do. 40 lbs.	672	379	4702	180	73—2—0	39	4-14—0	701	8-10—0	35—4—0	42-12—0	46-10—0	Average of 3 years.
Do. 60 lbs.	713	415	5247	221	89-13—0	104	13—0—0	1245	15—9—0	51-14—0	50-15—0	53—8—0	
Do. 80 lbs.	778	554	6367	265	107-11—0	186	23—4—0	2355	29—7—0	69—0—0	61-15—0	98—2—0	Average of 2 years
Do. 100 lbs.	1108	48	8922	463	175-10—0	195	24—6—0	4569	57-12—0	85-10—0	114—6—0	147-12—0	

Value of Manure: Amonium Sulphate 0—2—9 per lb.
Groundnut cake 0—1—0 ,,

Includes cost of powdering of cake, application and and covering with Junior hoe.

TABLE II

Direct Manuring to Cumbu and residual effect on cotton
Average yield for three years (1929—31)

Treatments	Mean yield of cumbu 1st year	Extra yield of cumbu over control	Value of extra yield of cumbu at 8 lbs per Re. 2nd year	Yield of Cotton in the next year.	Extra yield over control.	Value of extra yield of cotton 6½ as. per lb.	Cost of manure and application	Net profit of cumbu 1st year + cotton 2nd year	Remarks
1	2	3	4	5	6	7	8	9	10
	lbs.	lbs.	Rs. A. P.	lbs.	lbs	Rs. A. P.	Rs. A. P.	Rs. A. P.	
C. No manure	313			548					
A. Amm. Sulphate 2 cwts + Super 1"	749	436	54—0—0	595	47	19—2—0	54—8—8	19—2—0	
B. Gr. Cake 500 lbs. + Super 1 cwt.	636	323	40—6—0	616	68	27-10—0	42—4—0	25-12—0	

Direct manuring to cotton and residual effect on cumbu
Average yield for three years (1929—31)

Price : Kapas 6½ as per lbs. cumbu 8 lbs per Re.

1	2	3	4	5	6	7	8	9	10
			Rs. A. P.			Rs. A. P.	Rs. A. P.	Rs. A. P.	
C. No Manure	420			319					
A. Amm. Sulphate 2 cwts. + Super 1 cwt.	601	18	73—8—6	411	92	11—8—0	54—8—0	30—7—0	Amm. Sulphate : 0-2-9 per lbs.
C. Groundnut cake 520 lbs. + Super 1 cwt.	584	164	66-10—0	425	106	13—4—0	42—4—0	37-10—0	Super phosphate 0-2-0 per lbs.

Gleanings

Better Groundnuts Expected in Australia: It is hoped to develop groundnuts strains with a higher resistance to disease by crossing Australian varieties with vigorous plants obtained by the CSIRO from South America. It is also hoped that the hybrids produced will give a higher yield than the varieties now generally grown. Groundnut industry is well established in Queensland, and some success has also been achieved in northern parts of New South Wales. In the 1947-48 season the acreage in New South Wales increased to 67 compared with a mere 17 acres in the previous year and the yield was nearly 92,000 lb.

There seems, however little chance of establishing the crop in the cooler southern parts of the State. Trial crops have been grown for three years at the Yanco Experiment Farm, on the Murrumbidgee Irrigation Area, but the climate and heavy soils have proved unsuitable, and further trials in this area are considered useless. Variety trials will be continued at the Grafton Experiment Farm, on the North Coast, and in the Dumaresq River district, where irrigation is available.

Rice Crop should be a good one: Reports from the Murrumbidgee Irrigation Area, in New South Wales, indicate that the rice crop should be good this season, but not equal to the results obtained last year. In the older Griffith area, harvesting conditions have been made difficult by untimely rains. Australian rice industry is highly mechanised, and on the soils used for rice growing, wet weather creates many problems. Some growers found their machines bogged in the mud, and others had to use two tractors to pull the headers through the crop. Rice growing on the new Wakool area has begun fairly well. The crop has averaged about 1½ tons to the acre from 6,000 acres, yielding a crop worth about £A 180,000.

Australian rice yield about 50,000 tons this year: The Australian rice crop harvested from the 33,000 acres sown during the 1948—49 season will yield about 50,000 tons. The harvest is pleasing, since up to March, 1949, forecasts were very gloomy and it seemed that the first rice failure recorded in Australia might be imminent.

Cool conditions and weed infestation checked the crops originally but the grain now being harvested is excellent. Heads are somewhat smaller than last year and the average yield will consequently be lower than in 1947—48 but should reach between 32 and 35 cwt. an acre. Several of the best crops already harvested have reached two tons and over to the acre. Except for a small quantity reserved for invalids and for visiting and residential Asians in Australia, the entire crop will be exported to Eastern countries.

Important Agricultural Conference in Australia: Twenty or more scientific specialists from India, the United Kingdom, Canada, South Africa and New Zealand, together with several observers from the United States will attend the British Commonwealth Scientific Conference on agriculture to be held in Australia this month. This is the first of a series of specialist conferences recommended by the 1946 Official Scientific Conference held in London. Theme of the conference will be 'Plant and Animal Nutrition in Relation to Soil and Climatic Factors'. Leader of the overseas delegations will be Sir Edward Salisbury, Director of the Royal Botanic Garden (England); Professor E. W. Crampton, Department of Nutrition, McGill University (Canada); Dr. T. G. Mirchandani, Division of Agronomy, Agricultural Research Institute (India); Dr. E. J. Filmer, Animal Research Division, Department of Agriculture (New Zealand); Mr. J. C. Bonsma, Senior Animal Nutrition Research Officer, Department of Agriculture, (South Africa) Dr. I. Clunies Ross, Chairman of the Commonwealth Scientific and Industrial Research organisation will head the Australian delegates. Observers will include Professor W. Albrecht of the University of Missouri; Dr. Bonner, of the California Institute of Technology; and Dr. K. Hammer and Professor P. R. Stout, both of the University of California.

Conference will begin with a series of meetings in Adelaide, South Australia from August 22 to 31, followed by a 12-day tour of southern South Australia, Victoria and southern New South Wales to show delegates something of Australian research and agricultural practice. The final sessions will be held in Canberra, Australia's national capital, from September 13 to 15, 1949.

Mowing Checks Orchard Soil Erosion: An interesttng experiment in the control of soil erosion in a citrus grove has been in progress for three years at Kurrajong Heights, New South Wales, and the results have been particularly successful. The citrus grove was on steeply sloping land, and there was a continual loss of soil from water erosion. The owner of the property consulted the Department of Agriculture, and was advised to try controlling weed growth by mowing instead of cultivation. A small motor-operated mower was used whenever the weeds grew high enough to cut. Mown weeds were left on the ground. They provided a useful mulch in dry weather and decayed in the wet season to keep the soil in excellent physical condition. This practice preserved the mat of roots in the topsoil. Soil loss by erosion has been completely checked, even during periods of heavy rain. Only cultivation the orchard now receives is superficial treatment with a rotary hoe to a depth of 1½ inches, once a year when the main application of fertilizer is given. Improvement in the grove has been striking, and three other orchardists in the district have adopted the same methods.

Letters to the Editor

Further Experiences of an Educational Officer in Farming: Our Fruit Specialist was pleased to send for publication, extracts from the report I had sent him at his request. This was published under the title "Experiences of an Educational Officer in Fruit Farming" in Vol. No. XXXIV October 1947 of the Madras Agricultural Journal. This report has probably given readers an incorrect impression of this farm. That would not have mattered but for the fact that the article resulted in some letters to me from some farmers. With the repeated Editorial requests for brevity in mind, I shall be as brief as possible even at the risk of obscurity.

I planned a plan which differed from all the innumerable plans which made up the spate of plans for post-war and post-independence reconstruction experienced in recent years. While all the latter were made for the Government or someone else—chiefly Government, to carry out, mine had the unique feature that it was intended for me to work on, and it was not a Five year plan. I do not believe there is any magic in the figure Five. My favourite figure is three. In any case at my age, three years is a period long enough to look forward to. At the completion of my first three-year plan, I sent the above-mentioned report to the Fruit Specialist. Now, I have completed my second 3-year plan and commenced my third.

The two possible misconceptions are:— (1) That this farm is only an orchard. (2) That I am practising some combination of Hydroponics and soil-less culture compounding weird chemical mixtures, and juggling with pHs and other strange combinations of the alphabet.

I have my fair share of vanity (some would go further than that). In my vanity, I aimed at making this a "Pilot Farm" to demonstrate what scientific farming means. At the very outset I had to find the answers to two questions—what type of farming? What system of farming within the type? The answer to the first was obvious and that was "mixed Farming". The answer to the second was more difficult. It took me two three-year periods to find the answer. My third three-year plan is devoted to putting into practice, on an ever-increasing scale, the system evolved.

My system is "Mixed Diversified Farming" calculated to yield a profit and at the same time to build up the fertility of the soil. We have now an orchard, live stock (also "mixed" consisting of cattle including two stud-bulls presented by Sri G. V. Narayana, now Oil Seeds Specialist, goats, fowls and ducks), paddy, pulses, root crops and fodder i. e., grasses as well as deep-rooted and perennial and seasonal legume substitutes for lucerne.

Being a science graduate my idea of scientific farming was that of the Rothamsted School. All one has to do, I thought, was to use as manures various chemicals out of chemical factories. At the start there was a lot of them available which nobody wanted. Also groundnut cake of which I was buying some three tons annually for manure and cattle feed. Soon, fortunately very soon, I awakened to the fact that, instead of adopting practices which any ryot could copy, I had drifted into what few could imitiate. At the same time, the shortage of supplies began to develop. I foresaw "controls" would soon come in, which would effectively cut off all supplies. Even otherwise, I had strayed so far from my goal that I got alarmed lest I lose my bearings altogether.

About this time began a lot of talk and planning about starting ammonium sulphate factories by the Government of India. This brought forth a solemn warning against the use of Ammonium sulphate from Sir Albert Howard. I had never heard of him, yet I was intrigued. He must be somebody important for such a heterodox pronouncement to hit the newspaper head-lines. I found out and bought and read his books. Here, I thought, was an opportunity in my difficulty. And I took to composting by the Indore process. At first, I wondered—where is the organic waste on this desert of mine for composting? The most remarkable feature about this composting business is that if you set about it with determination, the more compost you make the more the organic waste you find you have overlooked which is asking to be composted. This composting is a great game that grows on you.

The last 12 months, I achieved something like a 100 tons of compost. One of the goals of my third three year programme is to achieve 500 tons of compost annually. I am confident I can do it.

The nett result is that I have recreated fertility in a goodly fraction of our acreage I don't need any soil analysts to tell me so; my plants and crops give me more reliable proof. During the last three years the only use I have put my sprayer to is whitewashing my buildings. The only insecticide I use is a little "Gammexane" in my seed-store; and to get rid of fleas and lice on my live-stock.

What is most important is that I no longer need buy any manures or fertilisers. Anybody is welcome to my quota of fertilisers and groundnut cake.

I have made my desert bloom like the rose.

Crop and Trade Reports

Statistics—Crop—Gingelly—1949—1950—Madras Province—First Forecast Report: The area under gingelly upto 25th July 1949 is estimated at 308,400 acres. When compared with the area of 246,100* acres estimated for the corresponding period of last year, it shows an increase of 25 per cent.

2. The estimated area is the same as that of last year in the districts of Guntur and Kurnoool. An increase in area is estimated in the other districts of the Province. The increase is due mainly to favourable season this year and the prevalence of attractive prices for gingelly seed. The increase in area is marked in the districts of Visakhapatnam (+ 4,100 acres), West Godavari (+ 3,400 acres), Chingleput (+ 8,900 acres), South Arcot (+ 3,400 acres), North Arcot (+ 3,900 acres), Salem (+ 15,800 acres) and Coimbatore (+ 15,200 acres). The condition of the crop is reported to be generally satisfactory and the yield per acre is expected to be normal except in parts of Nellore district where the crop was affected by insect pests.

3. The wholesale price of gingelly seed per imperial maund of 82 2/7 lbs. (or 3,200 tolas) as reported from important market centres on 6th August 1949 was Rs. 35—11—0 in Eluru, Rs. 30—10—0 in Vizianagaram, Rs. 30—9—0 in Tuticorin, Rs. 30—7—0 in Tirunelveli, Rs. 29—10—0 in Tiruchirapalli, Rs. 28—5—0 in Cuddalore, Rs. 27—9—0 in Kakinada, and Rs. 27—4—0 in Salem. When compared with the prices published in the report for the corresponding period of last year i. e., those which prevailed on 9th August 1948, these prices reveal a rise of 17 per cent in Eluru, and 3 per cent in Tuticorin and a fall of 23 per cent in Salem, 22 per cent in Tiruchirapalli and 13 per cent in Kakinada.

Statistics—Crop—Groundnut—1949—Madras Province—Second Forecast Report. Summer Crop Area and Yield: The area under the Summer crop of groundnut in parts of the Madras Province during the five months January to May 1949 is estimated at 91,700 acres as against 81,900 acres estimated for the corresponding period of last year, representing an increase of 12 per cent. The increase is due mainly to the prevalence of high prices for groundnut. The yield per acre is expected to be normal in the districts of Nellore, Tiruchirapalli, Tanjore and Mathurai and below the normal in other districts of the Province. The total yield is estimated at 75,800 tons of unshelled nut as against 66,000 tons estimated for the corresponding period of last year representing an increase of 14·8 per cent.

Early Crop: The area under the early crop of groundnut (mostly irrigated) upto 25th July 1949 in the districts of Salem and Coimbatore is estimated at 148,400 acres. When compared with the area of 143,500 acres estimated for the corresponding period of last year, it reveals an increase of 3·4 per cent. The increase is due to the prevalence of high prices for groundnut. The yield per acre is expected to be normal in Salem district and below the normal in Coimbatore district. The yield in these two districts is estimated at 71,300 tons of unshelled nuts as against 71,200 tons estimated for the corresponding period of last year representing an increase of 0·1 per cent.

2. The wholesale price of groundnut (machine-shelled) per imperial maund of 82 2/7 lb. or 3,200 tolas as reported from important market centres on 6—8—1949 was Rs. 29—12—0 in Guntur, Rs. 29—7—0 in Adoni, Rs. 28—6—0 in Nandyal, Rs. 27—14—0 in Cuddalore and Salem, Rs. 27—9—0 in Hindupur, Rs. 27—0—0 in Cuddapah, Rs. 26—9—0 in Tadpatri and Rs. 26—6—0 in Erode and Coimbatore. When compared with the prices published in the last report i. e., those which prevailed on 9—4—1949, these prises reveal a rise of 15 per cent in Cuddapah, 14 per cent in Guntur and Adoni, 9 per cent in Erode, 7 per cent in Nandyal and Salem, 6 per cent in Cuddalore, 5 per cent in Hindup ur and 4 per cent in Tadpatri and a fall of 7 per cent in Coimbatore.

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*Revised figure including the area under the crop in the merged States.

Statistics—Crop—Sugarcane—1949—First Forecast Report : The area under sugarcane upto 25th July 1949 is estimated at 122,000 acres. When compared with the area of 124,530* acres estimated for the corresponding period of last year, it reveals a decrease of 2,530 acres or 1·9 per cent. The estimated area is the same as that of last year, in Kurnool, Nellore, Pudukottai, Tanjore and South Kanara. An increase in area is revealed in the districts of West Godavari, Guntur, Anantapur, the Carnatic, Chittoor, and Ramnad and a decrease in the other districts of the Province.

2. The condition of the standing crop is reported to be generally satisfactory.

3. The wholesale price of jaggery per Imperial maund of 82 2/7 lb. (equivalent to 3,200 tolas) on 13th August 1949 was Rs. 24—10—0 in Erode, Rs. 23—12—0 in Cuddalore, Rs. 23—8—0 in Mangalore, Rs. 22—12—0 in Coimbatore and Tiruchirapalli, Rs. 22—4—0 in Vellore, Rs 21—0—0 in Bellary, Rs. 20—15—0 in Chittoor, Rs. 18—1—0 in Visakhapatnam, Rs. 15—10—0 in Kakinada, Rs. 12—13—0 in Vizianagaram and Rs. 11—12—0 in Adoni. (From Economic Adviser, Government of Madras)

Cotton Raw in the Madras Presidency : The receipts of loose cotton at presses and spinning mills in the Madras Presidency from 1st February, 1949 to 26th August, 1949 amounted to 295,399 bales of 392 lb. lint. The receipts in the corresponding period of the previous year were 314,128 bales. 389,027 bales mainly of pressed cotton were received at spinning mills and 3,946 bales were exported by sea while 80,135 bales were imported by sea from Karachi and Bombay. (Director of Agriculture, Madras).

Weather Review — For August 1949

RAINFALL DATA.

Division	Station	Actual for month in inches	Departure from normal in inches	Total since January 1st in inches	Division	Station	Actual for month in inches	Departure from normal in inches	Total since January 1st in inches
Orissa & Circars.	Gopalpore	4·5	—3·2	10·6	South.	Negapatam	3·1	0·0	11·4
	Calingapatam	5·7	—1·1	13·2		Adutural*	9·2	+5·8	17·6
	Vizagapatam	2·5	—2·7	14·7		Pattukottai*	4·4	+1·0	13·7
	Anakapalle*	5·6	+1·2	18·0		Mathurai	11·0	+6·9	28 3
	Samalkot*	3·1	—2·9	23·1		Pamban	2·3	+1·7	11·0
	Kakinada	9 9	+4·3	35·2		Koilpatti*	2·1	+0·2	12·2
	Maruteru*	7·6	+1·7	27 6		Palamcottah	...	...	...
	Masulipatam	7·8	+1·5	29·6		Amba-samudram*	0·3	—0·3	6·9
	Guntur*	6·9	+0·8	26·5					
	Agrl. College, Bapatla*	11·2	+5·7	29·5	West Coast.	Trivandrum	5·6	+0·9	43·0
	Veeravanam* (College Farm)	7·4	(x)	24·1		Cochin	18·1	+4·2	97.0
						Calicut	14·4	—2·7	111·9
						Pattambi	11·9	—3·0	80·6
Ceded Dists.	Kurnool	3 6	—0·9	16 9		Taliparamba*	37·3	+9·8	139·7
	Nandyal*	3·4	—1·9	18·3		Nileshwar*	28·1	+4·3	144·7
	Hagari*	2 8	+0·2	8·1		Pilicode*	28·3	+7·1$	137·9
	Siruguppa*	4·5	+0·7§	12·0		Mangalore	20·8	—4·7	139·6
	Bellary	3·7	+1·3	8·1		Kankanady*	22 3	—4·5	140·3
	Rentichintala	6·6	+3 1	22·7					
	Cuddapah	8 1	+2·9	21·8	Mysore & Coorg.	Chitaldrug	3·4	0·0	9·7
	Anantharajpet*	10·0	+5·8	28·3		Bangalore	6·6	+1·6	27·8
Carnatic.	Nellore	9·5	+6·6	25·7		Mysore	4·1	+0·8	17·8
	Buchireddi-palem*	3·8	+2·2	18·3		Mercara	23·4	—3·4	93·0
	Madras	5·2	+0·6	21·1	Hills.	Kodaikanal	8·6	+1·6	30·3
	Tirurkuppam*	8·8	+3·5$	29·7		Coonoor*	3·0	—2·0	19·8
	Palur*	5·4	+0·9	21·4		Ootacamund*	5·2	—0·4	28·5
	Tindivanam*	6·7	+2·7	16·4		Nanjanad*	7·3	0·0	27·7
	Cuddalore	4·0	—0·8	20·2					
Central.	Vellore	8·0	+2·3	28·5					
	Gudiyatham*	10·2	+6·0	27·2					
	Salem	5·2	—1·4	21·2					
	Coimbatore (A. C. R. I.)*	1 9	+0·6	9·3					
	Coimbatore (C. B. S.)*	2·4	+0·9	10·0					
	Coimbatore	6·2	+5·0	14 5					
	Tiruchirapalli	15·4	+11·3	26·8					

Note :— (1) * Meteorological Stations of the Madras Agricultural Department.

(2) Average of ten years data is taken as the normal

(3) x Readings are being recorded only from February 1948.

(4) $ Average of six years data for Tirurkuppam, and seven years data for Pilicode is given as normal.

(5) § Taluk office normal is 3·53", and Rainfall is 4·42".

(6) ... Figures are not available.

Weather Review for August 1949

The month began with an active South-West Monsoon. Widespread rains occurred along the West Coast. The vigour of the monsoon continued unabated till 6—8—1949 and thereafter it was low for a week. The monsoon strengthened again on 13-8-1949. On account of the seasonal trough of low, pressure lying from East United Provinces to North-West Bay of Bengal, there had been widespread and locally heavy showers in Andhra desa. A general rise in pressure over the country was noted on 16—8—1949. This resulted in fairly widespread rain in Kerala and South Kanara. Due to fall in pressure in the Southern Peninsular and rise in pressure at all other places on 21—8—1949, there were fairly widespread rains in Malabar and isolated showers in Tamilnad.

Owing to a discontinuity over the North-East Bay which developed into a trough of low pressure off North Coromandel Coast and a low pressure wave in the upper air off Malabar Coast, monsoon extended to Eastern Deccan causing widespread rain in Andhradesa and Tamilnad in the last week of the month. On the last day of the month, the vigour of the monsoon was felt in Malabar, perhaps due to the unsettled conditions over the Bay of Bengal.

Particulars regarding the heavy falls in August 1949 are detailed below :—

Serial No.	Date	Place	Rainfall in inches
1	3—8—1949	Mangalore	3·0
2	4—8—1949	Cochin	3·1
3	,,	Kozhikode (Calicut)	2·7
4	11—8—1949	Ongole	2·6
5	12—8—1949	Rentichintala	2·1
6	14—8—1949	Palghat	2·5
7	22—8—1949	Vizagapatam (Air Field)	5·0
8	23—8—1949	Kakinada (Cocanada)	3·7
9	26—8—1949	Tiruchirapalli	3·4
10	,,	Nellore	2·7
11	,,	Cuddapah	2·1
12	27—8—1949	Kurnool	2·0
13	29—8—1949	Mathurai	3·4
14	30—8—1949	Negapatam	2·1
15	31—8—1949	Anantapur	3·1

M. B. V. N., C. B. M., & M. V. J

OBITUARY.

We record with deep regret the death of Sri V. Achutharamayya, L. Ag., Assistant Marketing Officer, Kakinada. Sri V. Achutharamayya worked in the Madras Agricultural Department for twenty-eight years in various responsible capacities. He was very greatly responsible for the evolution of rice-strains for the Vizagapatam District. We extend our heartfelt sympathy and condolences to the members of the bereaved family.

Results of Examinations in Horticulture Courses, 1949.

List of Successful Candidates.

DIPLOMA IN INDIAN HORTICULTURE.

S. No.	Name	Register No.	Class in which placed	Ranking	Obtained Distinctions in
1	A. Adivi Reddi ...	20	I	4	Fruit Diseases.
2	C. M. Bakthavatsulu ...	23	III	19 (Bracketed)	...
3	P. S. Chandramouli (Private Student) ...	14	III	13	...
4	V. Dasaratharamayya (Stipendiary) ...	17	II	11	...
5	T. B. Dasarathi ...	1	II	10	Paper I (Fundamentals of Horticultural Science) and Fruit Pests.
6	K. Fazlulla Khan ...	22	I	2	Do. do. and Paper IV (Olericulture, ornamental gardening and other crops).
7	S. E. Kothandaraman ...	5	III	12	Paper I
8	P. A. Krishnamurthy ...	19	III	17	Fruit Diseases.
9	B. S. Kuppuswamy ...	7	II	8	...
10	H. Muddana Shetty ...	16	III	15	Fruit Products.
11	B. Narasimhan ...	18	I	3	Paper IV.
12	D. Narasimhamurthy ...	11	II	6	Paper I.
13	B. Padmanabharaju ...	12	III	19 (Bracketed)	...
14	G. Prabhakara Reddi ...	13	III	21	...
15	T. K. Ramachandran ...	10	III	18 (Bracketed)	...
16	V. Ramalingam ...	15	III	16	Fruit Diseases.
17	K. R. Raman ...	9	III	18 (Bracketed)	Do. do.
18	V. Sampath (Stipendiary Student) ...	2	III	20	...
19	T. K. Sankarasubramaniam ...	8	III	7	...
20	M. S. Sonwalkar (Candidate from C. P.) ...	21	III	14	...
21	J. Subramanyam ...	6	II	5	...
22	K. Tejappa Shetty ...	3	I	1	Paper I, Paper IV and Fruit Diseases.
23	T. K. Venkataraman ...	4	II	9	...

CERTIFICATE OF PROFICIENCY IN HORTICULTURE.

S. No.	Name	Register No.	Class in which placed	Ranking	Obtained Distinctions in
1	N. K. Achutha Menon ...	24	I	I	Paper II (Olericulture, ornamental gardening etc.)
2	M. Audinarayana Murthy (Stipendiary) ...	14	I	3	...
3	V. Appalanarashimam ...	16	III	14	...
4	K. Ayyappa Reddi ...	4	III	11 (Bracketed)	...
5	K. R. Balakrishnan ...	1	II	6	...
6	T. M. Govindaswamy ...	11	I	2	...
7	P. Guruswamy ...	7	II	4	...
8	J. Gurupatham ...	15	III	17	...
9	B. H. Kantha Rao ...	21	III	19	...
10	Ch. V. Krishna Rao ...	19	III	9	...
11	E. Lakshminarayana ...	10	III	11 (Bracketed)	...
12	S. Mangappan ...	8	II	7	Paper II (Olericulture, ornamental gardening etc.)
13	M. Narasimhamurthy ...	22	III	15	...
14	M. S. Narasimhamurthy ...	5	III	13	...
15	V. Navaratnam ...	13	III	18 (Bracketed)	...
16	K. C. Padmanabha Menon ...	23	II	5	...
17	K. Soundararajan ...	9	III	18 (Bracketed)	...
18	C. V. Subbiah ...	18	III	10	...
19	Syed Abdul Hamid ...	17	III	12	...
20	V. V. Tarakabrahman ...	6	III	8	...
21	A. Yasodaran (Stipendiary) ...	20	III	16	...

II *List of Failures:*

1	S. C. Marimuthu ...	2	These candidates are permitted to appear for the examinations to be held in 1950.
2	P. K. Raman (Stipendiary) ...	12	
3	M. Someswara Rao ...	3	

K. C. Naik,
13th August, 1949.
Fruit Specialist, Madras.

Departmental Notifications

GAZETTED SERVICE—POSTING AND TRANSFERS.

Name of Officers	From	To
Sri Chidambaram Pillai, A.	On leave,	Dy. D. A., Tanjore.
,, Chinnaswami Naidu, M.	On leave,	Dy. D. A., Bellary.
,, Govindakutty Kurup, P.	On leave,	Superintendent, Wynad Colonization, Scheme.
,, Jaganatha Rao, C.	Asst. Cotton Specialist, Nandyal,	Western Mungari Cotton Scheme, Hagari.
,, Dr. Kasinatha Iyer, S.	Dy. D. A., Bellary,	Asst. Agricultural Chemist, Coimbatore.
,, Krishnamurthi, K. S.	On leave,	Seed Development Officer for Paddy, Tanjore.
,, Lakshmipathi Rao, T.	On leave,	Seed Development Officer for Millet, Bellary.
,, Mayandi Pillai, S.	Asst. Cotton Specialist, Narasaraopet,	Northern Scheme, Nandyal.
,, Raman Menon, K.	On leave,	Asst. Marketing Officer, Coimbatore.
,, Ramana Rai, K. S.	Special A. D., Sugarcane Development Scheme, Mangalore,	D. A. O., Vellore.
,, Seshadri Iyengar, G.	Asst. Cotton Specialist, Adoni,	Cocanada Cotton Scheme, Narasaraopet.
,, Subramania Sarma, A. H.	Asst. Marketing Officer, Coimbatore,	Lecturer in Agricultural Economics, Coimbatore.
Janab Syed Mohammad Sahib,	D. A. O., Vellore,	Seed Development Officer, for Millet, Coimbatore.
Sri Viswanathan, K. B.	Asst. Paddy Specialist, Coimbatore,	Seed Development Officer, for Paddy, Vijayavada.

SUBORDINATE SERVICE.

Appointments Posting and Transfers.

The following B. Sc., Ag. Graduates are appointed as upper subordinates and are posted to the vacancies shown against each.

Name	To
Sri Bhaskara Rao, U. K.	A. D., Pollachi.
,, Chandrasekhara Rao, B.	Asst. in Mycology, Coimbatore.
Janab Ibrahim, S. P.	Asst. in Millet, A. R. S., Hagari.
Sri Jagannathan, S.	A. D., Villuppuram.
,, Krishnamurthi, P.	Asst. in Chemistry, Coimbatore.
,, Lakshmanan, N.	A. D., Palladam.
,, Nagarajan, S. N.	Asst. in Entomology, Coimbatore.
,, Periaswami, S.	Asst. in Entomology, Coimbatore.
,, Padmanabha Rao, T. R.	Asst. in Entomology, Singampatty.

Name	To
Sri Purusothaman, G.	P. P. Asst. in Entomology, Vellore.
,, Ramachandran, L.	A. D., Darsi.
,, Raman, N. V.	A. D., Avanashi.
,, Sri Ramulu, C.	Asst. in Millet, A. R. S., Nandyal.
,, Sanjevi, P. S.	Asst. in Millet, Coimbatore.
Sreemathi C. K. Rajam,	A. D., Tiruchirapalli.

Names	From	To
Sri Antony, J. S. C.	On leave,	A. D., Kallakurichi.
,, Anantha Rao, K.	A. D., Chicacole,	A. D., Tekkali.
,, Baskara Rao, M. V.	On leave,	A. D., Chintalapudi.
,, Chockalingam, M.	Asst. in Chemistry, Coimbatore,	F. M., Central Farm, Coimbatore.
,, Devasikamani, J.	F. M., Bhagavathi Farm, Siruguppa,	F. M., A. R. S., Siruguppa.
,, Gopalakrishnan, A.	A. D., Tekkali,	A. D., Chicacole.
,, Jayaraj, M. V.	Asst. in Cotton, Coimbatore,	Asst. in Cotton, Trichengode.
,, James Colaco,	Special A. D., Sugarcane Scheme, Mangalore,	F. M., Nileshwar, II.
,, Krishnan, T. B.	A. D., Avanashi,	Asst. in Cotton, Coimbatore.
Janab Mohammad Fasiuddin,	A. D., Anakapalle,	A. D., Bhimlipatam.
Sri Muthaiah, V.	Asst. in Chemistry, Coimbatore,	Asst. in Paddy, Coimbatore.
,, Narayana Iyer, N.	On leave,	A. D., Gudiyattam.
,, Rama Rao, B. K.	A. D., Karkal,	A. D., Hosur.
,, Subba Rao, A.	On leave,	F. M., Bhagavathi Farm, Siruguppa.
,, Siva Ramakrishnaiah, Y.	A. D., Bhimlipattam,	A D., Anakapalle.
,, Sadasiva Shetty, Y.	F. M., Cotton Breeding Station, Coimbatore,	Asst. in Cotton, Winter Scheme, Coimbatore, P.
,, Srinivasagopalan, D.	On leave,	P. Asst., in (Mycology) Tiruchirapalli.
,, Sethumadhavan, R.	P. P., Asst. in (Mycology) Tiruchirapalli,	P. P., Asst. in (Entomology) Tanjore.
,, Suryanarayanamurthi, T.	A. D., Darsi,	Asst. in Millet, A. R. S., Guntur.
,, Satyanarayana, T.	Special A. D., Tobacco Scheme, Sindarampatti,	A. D., Guntur.
,, Vaidyanathan, J.	On leave,	Special A. D., Tobacco Scheme Sendarampatti
,, Viswam Iyer, K. E.	On leave,	A. D., Mathurai.
,, Visvanathamurthi, K.	F. M., Siruguppa,	F. M., Bhagavathi Farm, Siruguppa.
,, Vasudeva Menon, K.	On leave,	Asst. in Chemistry, Coimbatore.
,, Viswanathan, M. A.	Asst. in Cotton, Coimbatore.	Asst. in Cotton, Avanashi.

The following candidates are selected to undergo the certificate course in Horticultural Training for a period of one year at Madras.

Names	From
Sri Anthoniswamy, N.	Nellikuppam.
,, Charles Stephen.	Coimbatore.
,, Haridas, C. M.	Wynad.
,, Lakshminarasimham, G.	Nellikuppam.
,, Pydayya, P.	Madras.
,, Ramaswami, R.	Tanjore.
,, Sambandam, G.	Coimbatore.
,, Nageswara Sarma, V.	Maruteru.
,, Sheith Abdul Sammad.	Sidhout.
,, Venkatesan, N.	Lalgudi.
,, Venkata Ramanan, R.	Nellikuppam.
,, Subba Ramaiah, M. V.	Eluru.

Agriculture College and Research Institute, Coimbatore.

LIST OF ADDITIONS TO LIBRARY FOR AUGUST 1949 (Book Only Listed)

1.	GOHAR (N):	Mycoses and Practical Mycology	1948
2.	BAILEY (Altone) Editor:	Cotton seed and cotton seed products—their Chemistry and Chemical Technology.—	
3.	GANAPATHY IYER (S. K.):	Kozhippannai (Poultry Farming) in Tamil 3 copies	1949
4.	PROCEEDINGS of the 6th International Conference of Agricultural Economists held at Darlington Hall, England, 28th August to 6 September, 1947.		1948
5.	MALHERBE (IDe. V):	Soil fertility	1948
6.	Reports of the Co-operative planning Committee appointed by the Government of India on the recommendation of 14th Registrars conference.		
7.	SALIM ALI:	Indian Hill Birds	1949
8.	Thackers Indian Directory of India and Pakistan		1948—49
9.	HOARE (A. H):	Fruit Culture	1948
10.	ROMANOFF (Alex L.):	Avian Egg:	1949
11.	Bibliography of Soil Science, Fertilizers and General Agronomy 1944—'47		1948
12.	MOYER (JAMES A):	Air Conditioning	1938
13.	MOYER (JAMES A):	Refrigeration including air conditioning and Cooling and household automatic refrigerating machines	1932
14.	CULPIN (C):	Farm machinery	1947

D. B. K.

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